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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/362,521	07/28/1999	YUNZHOU LI	10360/027001	6953

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STEUBING AND MCGUINNESS & MANARAS LLP  
125 NAGOG PARK  
ACTON, MA 01720

EXAMINER

PRIETO, BEATRIZ

ART UNIT	PAPER NUMBER
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2142

DATE MAILED: 08/03/2004

24

Please find below and/or attached an Office communication concerning this application or proceeding.

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## Office Action Summary

Application No.

09/362,521

Applicant(s)

LI, YUNZHOU

Examiner

Prieto B

Art Unit

2142

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6, 7, 9-13, 15-20 and 22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-7, 9-13, 15-20 & 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

***DETAILED ACTION***

1. This communication is in response to RCE/Amendment filed 05/23/03, claims 1-4, 6-7, 9-13, 15-20 and 22 remain pending and have been examined as hereby set forth.
2. Non-responsive filed amendment (second notice), it is noted that whenever there is an amendment to the claims pursuant to paragraph (d) of this section, there must also be supplied, on pages separate from the pages containing the changes, the status (i.e., pending or canceled), as of the date of the amendment, of all patent claims and of all added claims, and *an explanation of the support in the disclosure of the patent for the changes to the claims made by the amendment paper* (see Status of claims and support for claim changes MPEP 2234).

***Claim Rejection under 35 U.S.C. 101***

3. Claims 1 & 13 are rejected under 35 U.S.C. § 101 which reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.
4. Claims 1 & 13 are rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. In this case, computer-related inventions whether descriptive or functionally descriptive material are non-statutory categories when claimed as descriptive material *per se* (see *Warmerdam*, 33 F.3d at 1360 *USPQ2d* at 1759), falling under the “process” category (i.e. inventions at that consist of a series of steps or acts to be performed). See 35 U.S.C. 100(b) (“The term process means, art, or method, and includes a new of a known process, machine, manufacture, composition of matter or material”). Functional descriptive material: “data structures” representing descriptive material *per se* or computer program representing computer listing *per se* when embodied in a computer-readable media are still not statutory because they are not capable of causing functional change in the computer. However,

claimed computer-readable medium encoded with a data structure defined structural and functional interrelationships between the data structure and the computer software and hardware component, which permit the data structure's functionality to be realized, and is thus statutory (see MPEP 2106).

*Claim Rejection under 35 U.S.C. 112*

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In this case, it is noted that the boundaries of the patent protection sought are set forth definitely, albeit negatively, the claim complies with the requirements of 35 U.S.C. 112, second paragraph. An attempt to claim the invention by excluding what the inventors did not invent rather than distinctly and particularly pointing out what they did invent. In *re Schechter*, 205 F.2d 185, 98 USPQ 144 (CCPA 1953). A claim that recites a limitation in order to exclude the characteristics of the prior art, is considered definite when each recited limitation was definite. Specifically, in this case it is noted that *any exclusionary proviso must have basis in the original disclosure*. If alternative elements are positively recited in the specification, they may be explicitly excluded in the claims. See *In re Johnson*, 558 F.2d 1008, 1019, 194 USPQ 187, 196 (CCPA 1977) ("[the] specification, having described the whole, necessarily described the part remaining."). See also *Ex parte Grasselli*, 231 USPQ 393 (Bd. App. 1983), *aff'd mem.*, 738 F.2d 453 (Fed. Cir. 1984). The mere absence of a positive recitation is not basis for an exclusion. Any claim containing a negative limitation which does not have basis in the original disclosure should be rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement (see MPEP 2173.05(i)). It is not clear where in applicant's disclosure is the claim limitation

recited, whereby the multicast capable router is able to recognize and forward a multicast packet received via a path NOT indicated as the shortest path in the unicast routing table.

Further, regarding added "examination" step. It is noted that according to applicant's disclosure, PIM router 1021 will receive link state advertisement including information describing which routers support multicasting using this information to generate a multicast routing table in addition to a unicast routing table, see page 8, lines 6-12). After receiving a link state advertisement, if the state advertisement includes a multicast bit, the router can also update the multicast routing table by determining the multicast short path tree through multicast capable routers (e.g. those routers setting the MC bit), see page 9, lines 1-7. Claim limitation will be interpreted in light of the specifications.

*Claim Rejection under 35 U.S.C. 103*

7. Quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action may be found in previous office action.

8. Claims 1-4, 6-7, 9, 13, 15-20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deering, S.: Multicast routing internetworks and extended LANS in view of Shah, et. al. (Shah): Performance under a failure of Wide-Area datagrams network with unicast and multicast traffic routing in further view of Introduction to IP Multicasting Routing, Maufer, S., 3Com Corp., Jan. 1997

Regarding claim 1, Deering teaches substantial features of the invention as claimed, teaching

receiving link state advertisements by a router link state information from all routers attached to that link in the network (single destination), thereby learning all the link state and all the routers attached to that link from which they can determine the complete topology of the internetwork, the each router computing the shortest path tree spanning tree (section 6, page 98-99, section 4, page 91-92);

extending the link-state routing to support shortest-path multicast routing by receiving link state advertisements from routers in a network and constructing a multicast routing table from the received link state packets, the table corresponding a short path tree through multicast routers (section 6, page 98-99);

wherein the (“multicast routing”) table includes (“routing”) entries of (“link state advertisement”) state information having and capable of holding a multicast addresses including multicast address of group members associated with the multicast router (page 92); although Deering teaches learning all the link state and all the routers attached to that link and constructing unicast collection or report using received membership reports from routers on the network, he does not explicitly teach constructing an unicast routing table from received link state advertisements, nor discussed the use of an multicast bit;

Shah teaches constructing a unicast routing table from received link state packets, wherein said tables corresponds to a short path tree from multicast routers (section 3.3); additionally suggesting wherein table includes routing entries of link state advertisement information having and capable of holding a “multicast capable” bits indicating that the associated router is a multicast router, specifically, wherein MOSPF multicast capable routers maintain current image of the network using OSPF link-state protocol, supported by using multicast addresses (e.g. Ipv4 class D) a bit set to specify multicast host groups to uniquely identify multicast groups (section 2.1 multicasting on page 2); however although Deering and Shah teach identifying multicast entities by their address provided in the link state advertisement, they do not teach using a multicast bit;

Mauer teaches multicast capable routers receiving link state advertisements form other routers in the network are configured to determine from the link state advertisement information, specifically, the multicast capable bit, whether a router associated therewith supports multicast, specifically, where multicast receiving link state advertisement information can easily determine the multicast capability of any other router based on the setting of the multicast capable bit (MC-bit) in the options field of each router’s link state advertisements (see section 7.2.2) and forwarding a multicast packets (section 1.3.1)

and forwarding a multicast packet that was received on the short path tree in the multicast routing table (Shah: section 2.1 and 3.3).

It would have obvious to one ordinary skilled in the art at the time the invention was made to utilize Deerings teachings for learning all the link state and all the routers attached to that link using received membership reports from routers on the network with Shah teachings for constructing a unicast routing table from received link state packets, wherein said tables corresponds to a short path tree from multicast routers, motivation to maintain a current image of the network topology using a protocol independent protocol based on unicast and multicast routing tables yet independent of any particular unicast routing protocol, as taught by Shah. It would have further been obvious to combine the teachings of Mauer motivation would be to enable MOSPF routers be combined with non-multicast OSPF routers, permitting gradual deployment of MOSPF allowing multicast routing in autonomous systems permitting all routers to interoperate in forwarding unicast datagrams.

Regarding claim 2, performing reverse path forwarding using the multicast routing table (Shah: section 2.1 and 3.3).

Regarding claim 3, the link state advertisements comprise OSPF (Open Short Path First) link state advertisements (Shah: sections 2.2, 3.3, and section 2.1).

Regarding claim 4, the link state advertisements comprise MOSPF (Multicast Open Short Path First) link state advertisements (Shah: sections 2.1, and 3.3).

Regarding claim 6, constructing the multicast routing table comprises using Dijkstra's short path algorithm (Deering: section 2.2 and 3.3).

Regarding claim 7, correlates addresses of destination multicast capable routers with addresses of multicast capable routers on a short path tree of multicast capable routers (Deering: section 3, section 4).

Claim 8 cancelled.

Regarding claim 9, configuring PIM (Protocol Independent Multicasting) to use the multicast routing table (Shah: section 2.1).

Regarding claim 13, substantially the same as claims 1-7 when combined, same rationale of rejection is applicable.

Claim 14 cancelled.

Regarding claims 15-16, these claims are substantially the same as claim 3 and 11-12, respectively, discussed above, same rationale of rejection is applicable.

Regarding claim 17, this claim comprises the computer program product, disposed on a computer readable medium, for multicast routing, the computer program including instructions for causing a computer to perform the method discussed on claim 1, same rationale of rejection is applicable the apparatus, i.e. software implementation.

Regarding claims 18-19, these claims are the computer program product disposed on a computer readable medium for performing the method claims discussed above, the computer program including instruction for causing a computer to perform the method claims, specifically, claims 2, 4 and 7, respectively, same rationale of rejection is applicable.



Regarding claims 20 & 22, these claims are the computer program product disposed on a computer readable medium for performing the method claims discussed above, the computer program including instruction for causing a computer to perform the method claims, specifically, claims 9, and 11-12, same rationale of rejection is applicable.

9. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deering-Shah, in view of Mauer in further view of Haggerty et. al. (Haggerty) U.S. Patent No. 6,331,983

Regarding claim 10, however the above prior art does not explicitly teach performing a PIM RPF check function;

Haggerty teaches providing a routine for a PIM RPF check function (col 14/lines 66-col 15/line 9, col 18/lines 13-18).

It would have been obvious to one ordinary skilled in the art at the time the invention was made to incorporate performing PIM RPF check routine as taught by Haggerty, motivation would be to prevent loops in the spanning trees, as taught by Haggerty.

Regarding claims 11-12, reverse path forwarding in sparse mode and reverse path forwarding in dense mode (Haggerty: col 14/lines 55-col 15/line 9).

*Claim Rejection under 35 U.S.C. 102*

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1, 13 and 17 as amended are also are rejected under 35 U.S.C. 102(b) as being anticipated by Introduction to IP Multicasting Routing, Maufer, S., 3Com Corp., Jan. 1997.

Regarding claims 1, 13 and 17, Maufer teaches substantial features of the invention as claimed, teaching constructing a (“multicast routing”) table or database from received link state packets (sections 7.2-7.2.1.2) using MOSPF, the multicast routing table corresponding to a short path tree through multicast routers (section 7.2.2), table entries contain link state advertisement having multicast capable bit set indicating that the associated router is multicast router (section 7.2.2); determining from a link state advertisement received including a multicast capable bit whether the router associated with said received link state advertisement supports multicasting (section 7.2.2); constructing a (“unicast”) table or database from the received link state advertisement packet using unicast routing protocols such as RIP or OSPF (section 1.3.1 and sections 7.1.4), and forwarding multicast packets, such as performing reverse path forwarding using the multicast routing table corresponding to a short path tree through multicast routers upon arrival of multicast packets (section 6.2.1-6.2.1.1).

12. Applicant's arguments filed 5/23/04 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prieto, B. whose telephone number is (703) 305-0750. The Examiner can normally be reached on Monday-Friday from 6:00 to 3:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's Supervisor, Jack B. Harvey can be reached on (703) 305-9705. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3800/4700.

Any response to this action should be mailed to:

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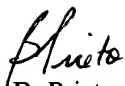
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Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington VA, Fourth Floor (Receptionist), further ensuring that a receipt is provided stamped "TC 2100".



B. Prieto  
TC 2100  
Patent Examiner  
August 2, 2004